

EXECUTIVE SUMMARY
AIRCRAFT ACCIDENT INVESTIGATION
MQ-1L "PREDATOR," S/N 99-003056
AT A DEPLOYED LOCATION ON 27 MARCH 2005

On 27 March 2005, at approximately 0240Z, an MQ-1L Predator, Remotely Piloted Aircraft (RPA), S/N 99-003056, crashed 10 miles north of a forward operating location (FOL) in the USCENTCOM theater. The aircraft departed controlled flight approximately eight minutes after an engine fire was detected. The mishap RPA (MRPA) was deployed from the 15th Reconnaissance Squadron, 57th Wing, Nellis AFB, Nevada. The fire was catastrophic, quickly burning through fuel and oil lines on the engine and other components in the engine bay. During the course of the fire, the engine failed. Seven minutes later, the aircraft experienced uncommanded pitch and roll changes as the structural integrity of the left tail plane servomotor weakened. One minute later, the left tail plane departed the aircraft and it departed controlled flight. The left tail plane was not at the impact site and was never recovered. There were no injuries or fatalities from the accident. Upon impact, the MRPA was damaged beyond economical repair. Other than the damage to the aircraft, valued at \$3,792,200, there was no damage to government or private property.

The primary cause of this accident, supported by clear and convincing evidence, was a catastrophic engine fire that spread through the engine bay and tail section of the aircraft. As the fire continued to grow fed by fuel, oil, and airflow from the air scoops, the ignition module was disabled causing the engine to fail, the left tail plane servomotor weakened causing the left tail plane to separate from the aircraft and the aircraft departed controlled flight. There is substantial evidence that the cause of the engine fire was a fuel leak on the left forward part of the engine that found an ignition source, most likely the turbocharger, alternator, or a cylinder head. The location of the fire as well as critical components on the left bulkhead, flammability of the fuel, materials used for fuel and oil lines, and routing of fuel, oil, and cooling air lines tend to indicate that the fuel priming solenoid feed line failed and the subsequent fuel leak was the ignition point of the fire. There is substantial evidence six additional factors substantially contributed to the mishap: (1) an O-ring seal on the #3 cylinder valve cover was pinched or cut during installation. After holding a seal for three previous flights, it may have failed and leaked oil that collected in the lower engine bay cowl and provided combustible material to feed the fire. While it is possible this could have been the ignition source, it is unlikely due to the high flashpoint of the oil; (2) the aircraft design uses rubber fuel and oil lines susceptible to fire and damage from exposure to extreme heat; (3) there is no dedicated fire-detection or fire-suppression system; (4) cockpit controls/switches/displays detract from safe mission completion; (5) inadequate procedural guidance for engine fires; (6) inadequate technical data on the proper routing of fuel, oil, and cooling lines; and (7) inadequate technical data on proper post flight inspection procedures resulting in a failure to detect fuel line chafing.

Under 10 U.S.C. 2254(d), any opinion of the accident investigators as to the cause of, or the factors contributing to, the accident set forth in the accident investigation report may not be considered as evidence in any civil or criminal proceeding arising from an aircraft accident, nor may such information be considered an admission of liability by the United States or by any person referred to in those conclusions or statements.